AF/JFW

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Steven Tysoe et al.	§	Group Art Unit:	1773
Serial No.: 10/672,623	§	Examiner:	Le, Hoa T.
Filed: September 26, 2003	§		
For: SOFT MAGNETIC PARTICLES METHODS OF MAKING AND ARTICLES FORMED THEREFROM	§	Atty. Docket:	134763-1/YOD GERD:0381

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

CERTIFICATE OF MAILING
37 C.F.R. 1.8

I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Mail Stop Appeal Brief-Patents, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on the date below:

November 27, 2006 — Signature
Date

APPEAL BRIEF PURSUANT TO 37 C.F.R. §§ 41.31 AND 41.37

This Appeal Brief is being filed in furtherance to the Notice of Appeal mailed on September 11, 2006, and received by the Patent Office on September 14, 2006; and following the Panel Decision mailed October 27, 2006.

The Commissioner is authorized to charge the requisite fee of $500.00, and any additional fees which may be necessary to advance prosecution of the present application, to Account No. 07-0868, Order No. 134763-1/YOD (GERD:0381).

1. **REAL PARTY IN INTEREST**

The real party in interest is General Electric Company, the Assignee of the above-referenced application by virtue of the Assignment to General Electric Company by Steven Tysoe, Robert Zabala, Luana Lorio and Amitabh Verma, recorded at reel 014552, frame 0523, and dated September 26, 2003. Accordingly, General Electric Company will be directly affected by the Board's decision in the pending appeal.

2. **RELATED APPEALS AND INTERFERENCES**

Appellants are unaware of any other appeals or interferences related to this Appeal. The undersigned is Appellants' legal representative in this Appeal.

3. **STATUS OF CLAIMS**

Claims 1-7 and 25-36 are currently pending, are currently under final rejection and, thus, are the subject of this Appeal.

4. **STATUS OF AMENDMENTS**

There are no outstanding amendments to be considered by the Board.

5. **SUMMARY OF CLAIMED SUBJECT MATTER**

The present invention relates generally to the field of soft magnetic particles. *See*, Application page 1, paragraph 1. More particularly, the present invention relates to soft magnetic particles, methods of making such particles and electromagnetic devices formed therefrom.

Soft magnetic materials find use in a variety of electromagnetic devices, such as, stators, rotors, solenoids, transformer cores, inductors, actuators, MRI pole faces, MRI shims, sensors, electronic circuits, and others. *See*, Application page 1, paragraph 3. For example, motors typically contain a stack of thin sheets of soft magnetic material (e.g., stator or rotor). The sheets within the stack are often insulated from one another to

prevent eddy current from circulating between the sheets. *See*, Application page 1, paragraph 3.

Unfortunately, the multiple steps required to punch and then stack each lamination is a time consuming and costly process. In addition, a large amount of scrap material is generated during the aforementioned punching steps. *See*, Application page 1, paragraph 4.

There is a continuing desire for more efficient electromechanical devices, namely devices that overcome one or more of the aforementioned efficiency and other deleterious effects of prior devices. *See*, Application page 1, paragraph 5. The Application contains three independent claims, namely, claims 1, 25 and 31, all of which are the subject of this Appeal. The subject matter of these claims is summarized below.

With regard to the aspect of the invention set forth in independent claim 1, discussions of the recited features of claim 1 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention provides a soft magnetic particle (e.g., 20). *See, e.g., id.* at page 3, paragraph 17, lines 1-5; *see also*, FIGS. 2-3. The soft magnetic particle comprises an elongated first portion (e.g., 22) formed of a soft magnetic material. *See, e.g., id.* at page 3, paragraph 17, lines 1-5; page 4, paragraph 18, lines 1-5; *see also*, page 4, paragraph 20, lines 1-9. The soft magnetic particle comprises a second portion (e.g., 24) disposed on said first portion (e.g., 22) in an amount from about 0.05 weight percent to about 1 weight percent. *See, e.g., id.* at page 3, paragraph 17, lines 1-5; page 5, paragraph 26, lines 6-9; *see also*, FIGS. 2-3. The second portion (e.g., 24) is formed of an electrically insulating material. *See, e.g., id.* at page 4, paragraph 19, lines 1-5.

With regard to the aspect of the invention set forth in independent claim 25, discussions of the recited features of claim 25 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in

accordance with the present invention provides a soft magnetic particle (e.g., 20). *See, e.g., id.* at page 3, paragraph 17, lines 1-5; *see also*, FIGS. 2-3. The soft magnetic particle comprises an elongated first portion (e.g., 22) formed of a soft magnetic material. *See, e.g., id.* at page 3, paragraph 17, lines 1-5; page 4, paragraph 18, lines 1-5; *see also*, page 4, paragraph 20, lines 1-9. The soft magnetic particle comprises a second portion (e.g., 24) disposed on said first portion (e.g., 22) in an amount from about 0.05 weight percent to about 0.15 weight percent. *See, e.g., id.* at page 3, paragraph 17, lines 1-5; page 5, paragraph 26, lines 6-10; *see also*, FIGS. 2-3. The second portion (e.g., 24) is formed of an electrically insulating material. *See, e.g., id.* at page 4, paragraph 19, lines 1-5.

With regard to the aspect of the invention set forth in independent claim 31, discussions of the recited features of claim 31 can be found at least in the below cited locations of the specification and drawings. By way of example, an embodiment in accordance with the present invention provides a soft magnetic particle (e.g., 20). *See, e.g., id.* at page 3, paragraph 17, lines 1-5; *see also*, FIGS. 2-3. The soft magnetic particle comprises a first portion (e.g., 22) formed of a soft magnetic material. *See, e.g., id.* at page 3, paragraph 17, lines 1-5; *see also*, page 4, paragraph 18, lines 1-5. The soft magnetic particle comprises a second portion (e.g., 24) disposed on said first portion (e.g., 22) in an amount from about 0.05 weight percent to about 0.15 weight percent. *See, e.g., id.* at page 3, paragraph 17, lines 1-5; page 5, paragraph 26, lines 6-10; *see also*, FIGS. 2-3. The second portion (e.g., 24) is formed of an electrically insulating material. *See, e.g., id.* at page 4, paragraph 19, lines 1-5.

A benefit of the invention, as recited in these claims, is the ability to provide electromagnetic devices (e.g., 10) having minimal core losses and high permeability. *See, e.g., id.* at page 6, paragraph 28, lines 1-3. Advantageously, particle (e.g., 20) having the elongated first portion (e.g., 22) and thin, uniform second portion (e.g., 24) is configured to provide electromagnetic devices (e.g., 10) with a core loss of less than about 6 watts per pound at a magnetic flux density of about 1 Tesla and a frequency of about 60 Hertz. *See, e.g., id.* at page 6, paragraph 27, lines 1-11.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Sole Ground of Rejection for Review on Appeal:

Appellants respectfully urge the Board to review and reverse the Examiner's sole ground of rejection in which the Examiner rejected claims 1-7 and 25-36 under 35 U.S.C. § 102(e) as being anticipated by Moro, U.S. Patent No. 6,940,388 (hereinafter Moro).

7. ARGUMENT

As discussed in detail below, the Examiner has improperly rejected the pending claims. Further, the Examiner has misapplied long-standing and binding legal precedents and principles in rejecting the claims under Section 102. Accordingly, Appellants respectfully request full and favorable consideration by the Board, as Appellants strongly believe that claims 1-7 and 25-36 are in condition for allowance.

A. Sole Ground of Rejection:

The Examiner rejected claims 1-7 and 25-36 under 35 U.S.C. § 102(e) as being unpatentable over the Moro reference.

1. Judicial precedent has clearly established a legal standard for a *prima facie* anticipation rejection.

Anticipation under Section 102 can be found only if a single reference shows exactly what is claimed. *Titanium Metals Corp. v. Banner*, 227 U.S.P.Q. 773 (Fed. Cir. 1985). Thus, for a prior art reference to anticipate under Section 102, every element of the claimed invention must be identically shown in a single reference. *In re Bond*, 15 U.S.P.Q.2d 1566 (Fed. Cir. 1990). Moreover, the prior art reference also must show the *identical* invention "*in as complete detail as contained in the ... claim*" to support a *prima facie* case of anticipation. *Richardson v. Suzuki Motor Co.*, 9 U.S.P.Q. 2d 1913, 1920 (Fed. Cir. 1989) (emphasis added). Accordingly, Appellants need only point to a single element not found in the cited reference to demonstrate that the cited reference fails to anticipate the claimed subject matter.

2. **The Examiner's rejection of claims 1 and 25 are improper because the rejection fails to establish a *prima facie* case of anticipation.**

Independent claims 1 and 25 recite a soft magnetic material comprising an elongated first portion formed of a soft magnetic material and a second portion disposed on the first portion, the second portion being formed of an electrically insulating material.

For a reference to be anticipatory, each and every element of Appellants' claims must be present in a single reference. The Examiner stated in the Final Office Action (page 2, section 2.1) that Moro discloses:

> "[t]he shape of the ferromagnetic metal powder, without any particular limitation, may be spherical or flat." (emphasis added) (col. 3, line 27-29). Thus, the magnetic material powder is not limited to just spherical or flat. Moreover, a flat shape broadly includes elongated shape.

According to Moro, the ferromagnetic metal powder may be spherical or flat. Appellants observe that the Examiner analysis seems to have mischaracterized the above statement to include shapes other than spherical and flat. However, Moro does not teach or disclose shapes other than spherical and flat to the metal powder.

Further, the Examiner argued that a flat shape broadly includes elongated shape. Appellants observe that this statement is simply incorrect. A "flat" particle does not imply an elongated particle. The commonly understood meaning of the term "elongated" as used in the present application indicates that one dimension of the particle exceeds the other two dimensions. By contrast, the commonly understood meaning of the term "flat" as used in Moro implies that two dimensions of the particle will exceed a third dimension. Appellants believe that these plain meanings are simply beyond dispute. Therefore, the claimed elongated particles are not taught by the reference to "flat" particles in Moro.

In practice, the shape of the particles of the present application is believed to affect the magnetic properties. The present application (paragraph 20, 27 and 28) states:

> It has been determined that the shape of first portion 22 can effect the magnetic properties exhibited by electromagnetic devices 10. Specifically, it has been found that electromagnetic devices 10 exhibit increased magnetic properties with particles 20 having an elongated shape as compared to, for example, spherical particles. For example, particle 20 can have an aspect ratio of between about 20 to about 500.
>
> Advantageously, particle 20 having the aforementioned elongated first portion and thin, uniform second portion 24 is configured to provide electromagnetic devices 10 with a core loss of less than about 6 Watts per pound at a magnetic flux density of about 1 Tesla and a frequency of about 60 Hertz. In other embodiments, particle 20 is configured to provide electromagnetic devices 10 with a core loss of less than about 2.5 Watts per pound at a magnetic flux density of about 1 Tesla and a frequency of about 60 Hertz. Further, particle 20 having the aforementioned elongated first portion and thin, uniform second portion 24 provides electromagnetic devices 10 with a magnetic permeability of greater than about 1000 at a magnetic flux density of about 1 Tesla and a frequency of about 60 Hertz.
>
> Thus, the elongated shape of particles 20 is particularly configured to provide electromagnetic devices 10 having minimal core losses and high permeability.

The present application describes that the particles having an elongated shape exhibit better magnetic property as compared to particles having other shapes. The shape of the particle is integral to provide desired magnetic flux density. Moreover, the aspect ratio of the present particle, as defined as the ratio of the largest dimension of particle to the smallest dimension, indicates an elongated particle. Thus, both by the plain meaning of the terminology, and the distinctions in the underlying properties owing to the claimed shape, Moro cannot anticipate the "elongated" particles claimed.

Because Moro does not teach an elongated soft magnetic material, it necessarily does not teach, each and every element of claims 1 and 25. Consequently, Moro does not anticipate claims 1 and 25. Accordingly, the Appellants request the Board to reverse the decision and allow independent claims 1 and 25 and claims depending therefrom, claims 2-7 and 26-30.

3. **The Examiner's rejection of claims 2, 25 and 31 are improper because the rejection fails to establish a *prima facie* case of anticipation.**

Claims 2, 25 and 31 recite a soft magnetic particle comprising a first portion formed of a soft magnetic material and a second portion disposed on the first portion in an amount from about 0.05 weight percent to about 0.15 weight percent. Claim 2 is believed to be patentable as it depends directly from presumably allowable claim 1. In addition, Moro does not teach or disclose the range mentioned in the claims 2, 25 and 31.

For a reference to be anticipatory, each and every element of Appellants' claims must be present in a single reference. Moro discloses:

> The amount of methyl-phenyl silicone resin to be added is in a range from 0.3 to 5.0 wt % and preferably 0.5 to 3.0 wt % based on the ferromagnetic powder. When the amount of methyl-phenyl silicone resin to be added is 0.3 wt % or less, insulation between the ferromagnetic metal powder particles in the dust core is insufficient and therefore eddy current loss is increased, resulting in increased core loss. Col. 5, lines 10-17 (emphasis added).

As noted above, Moro does not teach or disclose the range of the instant claims. The Appellants believe that the Examiner has misinterpreted "0.3 wt % or less" of Moro to include the range "0.05 weight percent to about 0.15 weight percent" as recited in the instant claims. The range "0.3 wt % or less" does not imply the Appellants' range unless the reference clearly mentions the range "0.05 weight percent to about 0.15 weight

percent". However, Moro does not teach or disclose the weight percentages of the instant claims.

Secondly, the Examiner cited *In re Nehrenberg* (CCPA), 129 USPQ 383 to reject the instant claims. As best understood, the Examiner's argument is that when the prior art discloses specific ranges, but then adds that those ranges are not preferred, the mention may nevertheless be relied upon for anticipation. The present case is clearly distinguishable. If Moro disclosed the range recited in claims 2, 25 and 31 *at all*, and then taught that it was useful only for certain limited purposes, or even should be avoided, the Examiner may have grounds to argue that the range is nevertheless taught. In this case, however, Moro simply *does not disclose* the range of claims 2, 25 and 31. Moro only mentions other, much higher ranges for weight percentages of insulation coatings on flat magnetic particles. Nowhere in the reference are *any other* weight percentage ranges mentioned, or even dispelled as undesirable or not preferred.

Moro does not teach the ranges of the instant claims and hence cannot anticipate claims 2, 25 and 31. Accordingly, the Appellants request the Board to reverse the decision and allow claims 2, 25 and 31 and claims depending therefrom, claims 26-30 and 32-36.

Conclusion

Appellants respectfully submit that all pending claims are in condition for allowance. However, if the Examiner or Board wishes to resolve any other issues by way of a telephone conference, the Examiner or Board is kindly invited to contact the undersigned attorney at the telephone number indicated below.

Respectfully submitted,

Date: 11/27/2006

Patrick S. Yoder
Reg. No. 37,479
FLETCHER YODER
P.O. Box 692289
Houston, TX 77269-2289
(281) 970-4545

8. APPENDIX OF CLAIMS ON APPEAL

1. A soft magnetic particle comprising:

an elongated first portion formed of a soft magnetic material; and

a second portion disposed on said first portion in an amount from about 0.05 weight percent to about 1 weight percent, said second portion being formed of an electrically insulating material.

2. The soft magnetic particle as in claim 1, wherein said amount is from about 0.1 weight percent to about 0.15 weight percent.

3. The soft magnetic particle as in claim 2, wherein said electrically insulating material comprises silicone.

4. The soft magnetic particle as in claim 1, wherein said soft magnetic material comprises Fe or an Fe alloy.

5. The soft magnetic particle as in claim 4, wherein said Fe alloy comprises Fe and at least one element selected from the group consisting of Co, Ni, Si, Al, B, P, C, Cr, Mn, and any combinations thereof.

6. The soft magnetic particle as in claim 1, wherein said first portion has an aspect ratio of between about 20 to about 500.

7. The soft magnetic particle as in claim 6, wherein said first portion has a cross-sectional shape selected from the group consisting of a rectangular shape, a polygonal shape, an oval shape, an elongated circular shape, and any combinations thereof.

25. A soft magnetic particle comprising:

an elongated first portion formed of a soft magnetic material; and

a second portion disposed on said first portion in an amount from about 0.05 weight percent to about 0.15 weight percent, said second portion being formed of an electrically insulating material.

26. The soft magnetic particle as in claim 25, wherein said electrically insulating material comprises silicone.

27. The soft magnetic particle as in claim 25, wherein said soft magnetic material comprises Fe or an Fe alloy.

28. The soft magnetic particle as in claim 27, wherein said Fe alloy comprises Fe and at least one element selected from the group consisting of Co, Ni, Si, Al, B, P, C, Cr, Mn, and any combinations thereof.

29. The soft magnetic particle as in claim 25, wherein said first portion has an aspect ratio of between about 20 to about 500.

30. The soft magnetic particle as in claim 29, wherein said first portion has a cross-sectional shape selected from the group consisting of a rectangular shape, a polygonal shape, an oval shape, an elongated circular shape, and any combinations thereof.

31. A soft magnetic particle comprising:

a first portion formed of a soft magnetic material; and

a second portion disposed on said first portion in an amount from about 0.05 weight percent to about 0.15 weight percent, said second portion being formed of an electrically insulating material.

32. The soft magnetic particle as in claim 31, wherein said electrically insulating material comprises silicone.

33. The soft magnetic particle as in claim 31, wherein said soft magnetic material comprises Fe or an Fe alloy.

34. The soft magnetic particle as in claim 33, wherein said Fe alloy comprises Fe and at least one element selected from the group consisting of Co, Ni, Si, Al, B, P, C, Cr, Mn, and any combinations thereof.

35. The soft magnetic particle as in claim 31, wherein said first portion has an aspect ratio of between about 20 to about 500.

36. The soft magnetic particle as in claim 31, wherein said first portion has a cross-sectional shape selected from the group consisting of a rectangular shape, a polygonal shape, an oval shape, a circular shape, an elongated circular shape and any combinations thereof.

9. EVIDENCE APPENDIX

None.

10. RELATED PROCEEDINGS APPENDIX

None.